

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 – 36 (Cancelled)

37. (New) A method of operating an internal combustion engine, the method comprising:

providing, in a housing, a piston and a shaft, wherein over a course of rotation of the shaft there are successively defined volumes in differing amounts within the housing for phases of compression, combustion, and expansion,

causing compression of a working medium, introduced through an intake port, by reducing volume in the compression phase from an initial volume to a second volume that is less than the initial volume;

causing combustion, in the combustion phase, while maintaining substantially constant volume, of fuel that has been introduced through a fuel port into the working medium; and

undergoing expansion, in the expansion phase, of gases from combustion while the volume increases to a third volume that is larger than the initial volume;

wherein volume size varies, if at all, over the course of shaft rotation, defining successively volumes in differing amounts for phases of compression, combustion, and expansion, in a manner that is smooth and continuous.

38. (New) The method of operating an internal combustion engine of claim 37, wherein the working medium is selected from the group consisting of air and a mixture of air and fuel.

39. (New) A method of operating an internal combustion engine according to claim 37, wherein the fuel has been introduced after the working medium has been compressed to the second volume.

40. (New) A method of operating an internal combustion engine according to claim 37, wherein causing combustion comprises maintaining conditions under which the fuel undergoes spontaneous ignition.

41. (New) A method of operating an internal combustion engine according to claim 37, further comprising, using an energy recovery system to increase the heat of combustion of the fuel medium before it is introduced to the fuel port.

42. (New) A method of operating an internal combustion engine according to claim 41, further comprising, using the energy recovery system additionally to reduce the temperature of the gases from combustion.

43. (New) A method of operating an internal combustion engine according to claim 41, wherein using the energy recovery systems includes causing thermo-chemical decomposition of gaseous fuel.

44. (New) A method of operating an internal combustion engine according to claim 43, wherein using the energy recovery systems includes causing a catalyst-assisted reaction occurring at a constant temperature between 450 degrees C and 750 degrees C.